

Mark Twain National Wildlife Refuge Complex

Summary of the Draft Comprehensive Conservation Plan

USFWS Photograph



Introduction to the Mark Twain National Wildlife Refuge Complex

Stretching along the Mississippi River floodplain, the Mark Twain National Wildlife Refuge Complex (Complex) is a mosaic of big river, wetland, forest, grassland and cropland. Each habitat type plays an important role in providing the resources necessary to support a rich diversity of fish and wildlife. The Mississippi River (River) is one of the most important migration corridors in the world, with millions of

migratory birds using the corridor each year during fall and spring migration. The River's north-to-south orientation and nearly contiguous habitat have made it critical to the life cycle of many migratory birds for centuries, from diving ducks, swans and pelicans to dabbling ducks, geese, bitterns and rails.

Bottomland forests support resident and neotropical migrant songbirds, bald eagles, red-shouldered hawks, mallards, wood ducks, hooded mergansers, and nesting colonies of herons and egrets. Some of the largest wintering concentrations of bald eagles in the contiguous 48 states are found along the River. Some adult eagle pairs remain throughout the year to nest and raise their young. Other birds as varied as the wild turkey, bobwhite, belted kingfisher, cardinal, red-headed woodpecker and great-horned owl can be seen all year. A variety of wildlife including deer, squirrel, raccoon, opossum, fox, muskrat, beaver, fish, frogs, turtles, lizards, and snakes also live on the refuges of the Mark Twain Complex.

Contents

Introduction to the Mark Twain National Wildlife Refuge Complex /	1
Who We Are and What We Do /	2
Comprehensive Conservation Planning /	3
Refuge Complex Vision Statement /	3
The Planning Process /	4
Resource Management Today /	5
Land Preservation Component /	10
Management Alternatives /	13
Future Management Direction /	17
Plan Implementation /	25
Where You Can Find the Draft CCP /	26
Tell Us What You Think /	26

What is today a complex of refuges began as a single refuge. Mark Twain National Wildlife Refuge was established in 1958 from lands originally purchased by the U.S. Army Corps of Engineers (COE) for construction of the Mississippi River 9-foot navigation channel project. Since then other areas have been added to the refuge, which is now over 44,000 acres including the Iowa River Corridor Project, scattered along 342 miles of Mississippi River. Much of the Complex (about 17,000 acres) is General Plan lands owned fee title by the COE, but managed by FWS under a Cooperative Agreement. Mark Twain NWR originally consisted of three districts (Wapello, Brussels, and Annada) with land in three states - Iowa, Illinois, and Missouri.

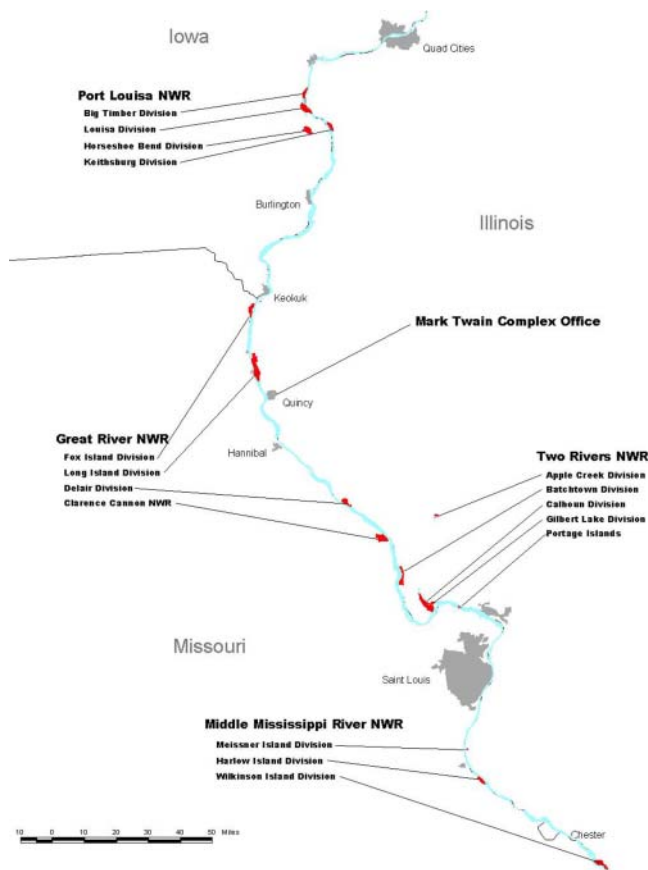
The Refuge name created identity confusion due to the number of other areas, including forests, caves, banks, buildings, a bridge and a casino, among others, bearing the name of Mark Twain. In an effort to reduce that confusion, Mark Twain NWR was reorganized as a complex of refuges. Individual refuge names are now more recognizable within their respective communities. The Complex includes Port Louisa NWR near Wapello, Iowa; Great River NWR and Clarence Cannon NWR

U.S. Fish & Wildlife Service

near Annada, Missouri; Two Rivers NWR near Brussels, Illinois; and Middle Mississippi River NWR south of St. Louis, Missouri. The Complex Headquarters is located in Quincy, Illinois. This plan does not include Iowa River Corridor lands managed in cooperation with the Iowa Department of Natural Resources (DNR) and the Natural Resources Conservation Service (NRCS).

Managing a refuge complex demands long-range planning that reflects vision, science and people. This document offers a summary of the Draft Comprehensive Conservation Plan (CCP) for the Mark Twain Refuge Complex. The CCP describes how we will provide for migratory species within our boundaries, work with partners to improve habitats beyond our boundaries, expand opportunities for wildlife-dependent recreation, and develop environmental education and outreach programs to increase appreciation of fish and wildlife.

This summary offers a brief overview of the Refuge Complex and what we hope to accomplish in the next 15 years.



Who We Are and What We Do

The U.S. Fish and Wildlife Service is the primary federal agency responsible for conserving, protecting, and enhancing fish and wildlife and their habitats for the continuing benefit of the American people. Our specific responsibilities include enforcing federal wildlife laws, managing migratory bird populations, restoring nationally significant fisheries, administering the Endangered Species Act, and restoring wildlife habitat such as wetlands. The mission of the Service is to work with others to conserve, protect, and enhance fish, wildlife and plants and their habitats for the continuing benefit of the American people.

The Service's role also includes managing the National Wildlife Refuge System, the world's largest collection of lands specifically managed for fish and wildlife. The System is a network of more than 530 national wildlife refuges and WMDs encompassing more than 93 million acres of public land and water. The majority of these lands - 82 percent - are in Alaska, with approximately 16 million acres spread across the remaining states and several island territories. National wildlife refuges provide habitat for more than 5,000 species of birds, mammals, fish and insects. The mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management and, where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

Refuges are also unique places for people. When it is compatible with wildlife and habitat needs and the purpose for which the refuge was established, they can be used for wildlife-dependent activities such as hunting, fishing, wildlife observation, photography, environmental education and environmental interpretation.



Comprehensive Conservation Planning

Congress has mandated that the Service prepare long-range plans for each refuge in the National Wildlife Refuge System. The National Wildlife Refuge Improvement Act of 1997 established the comprehensive conservation planning process as the vehicle refuges would use for planning and communicating plans to the public.

Planning has always occurred on national wildlife refuges, but the comprehensive conservation planning process establishes a more consistent method of planning with much greater participation by people, communities and organizations interested in a refuge's future. Preparation of this CCP will benefit management of the Refuge Complex by:

- Providing a clear statement of direction for future management of the Complex.
- Giving refuge neighbors, visitors and the general public an understanding of the Service's management actions on and around Complex refuges.
- Ensuring that Complex management actions and programs are consistent with the mandates of the National Wildlife Refuge System.
- Ensuring that Complex management is consistent with federal, state and county plans.
- Providing a basis for the development of budget requests on Complex refuges' operation, maintenance, and capital improvement needs.

Several legislative mandates within the National Wildlife Refuge System Improvement Act of 1997 have guided the development of the Plan. These mandates include:

- Wildlife has first priority in the management and uses of refuges.
- Wildlife-dependent recreation activities including hunting, fishing, wildlife observation wildlife photography, environmental (wildlife and habitat) education and interpretation are priority public uses of the Refuge System. These uses will be facilitated when they do not interfere with the refuge's ability to fulfill its purposes or the mission of the Refuge System.
- Other uses of the refuges will only be allowed when they are determined to be appropriate and compatible with refuge purposes and the mission of the Refuge System.

Refuge Complex Vision Statement

For thousands of years, the Mississippi River corridor has served as an important migration route for millions of ducks, geese, shorebirds, waterbirds, songbirds, hawks, eagles and gulls. This network of wetlands, forests, and grasslands has also provided habitat for a variety of fish and resident wildlife species. The Upper Mississippi River (UMR) floodplain has been greatly altered for agricul-

ture, urbanization, navigation and flood control. The quantity and quality of wildlife habitat on the River has declined. We believe that partnerships will play a key role in achieving the long-term ecological integrity of the UMR.

Cooperative working relationships between federal and state agencies, industry, and the public are crucial to achieving a balance between commercial navigation, recreation, river habitat for wildlife and safe municipal water. Refuge Complex lands will contribute to larger public policy goals regarding floodplain management. Research and monitoring data must be current, readily available, and applicable to land management decision-making needs. In the future, the Complex management program on 500 miles of the UMR will be an exemplary model for partnerships and science-based wildlife management.

The River will provide a mosaic of habitats to sustain healthy populations of native wildlife. Managed lands, such as those within the Complex, have become critical for the ecological sustainability of the UMR. A balanced program of habitat protection, enhancement, and restoration will consider overall habitat needs on the pool, reach, and watershed levels. The Complex will provide high-quality habitat along the UMR for migratory birds, other wildlife species, and fish. Management programs will be effectively monitored for success and adapted and modified as new scientific information becomes available.

While wildlife management remains the primary purpose of the Refuge Complex, compatible public use and enjoyment of those resources is also important. The Complex will provide an array of environmental and wildlife education programs and wildlife-dependent recreational activities. Habitat management programs and public use facilities will attract thousands of visitors annually. The partnership with the Army Corps of Engineers involving the Riverlands Project Area provides an opportunity for conducting a quality off-refuge wildlife education and interpretation program within a large metropolitan area. Local communities will appreciate the role of the Service in managing quality wildlife habitat and contributing to floodplain factors such as flood water storage and helping to provide for clean, safe water in the river corridor.

The Planning Process

Comprehensive conservation planning is slow work. The Mark Twain CCP effort began in 1997 with internal scoping of the issues among Refuge and Regional Office staff. Following internal scoping, the Refuge Complex hosted six open houses in local communities to inform the public of the planning process. Interested citizens attending each open house were asked to express their thoughts and concerns regarding refuge programs and operations. News releases were issued to local communities prior to each open house. Refuge staff participated in additional public involvement by joining in six of the Habitat Needs Assessment public meetings held in 1999 where the National Audubon Society and Upper Mississippi River Conservation Committee (UMRCC) gathered public input on current and future priorities for the River system.

Because the Complex overlays thousands of acres of COE General Plan (GP) lands within the floodplain, the COE was asked to participate in the CCP process as a cooperating agency in accordance with NEPA guidelines. Coordination efforts were established with both the Rock Island and St. Louis Districts. The

Directors of the Illinois Department of Natural Resources and the Iowa Department of Natural Resources and the Director of the Missouri Department of Conservation designated points of contact at their State Office level for providing state input on the CCP process.

The following, in no particular order, is a summation of major issues discussed at open houses and inter-agency meetings. Refuge program goals, objectives, and strategies listed in the draft CCP address each of these issues.

- Water level management
- Fishery resources
- Forest management
- Recreational opportunities
- Wildlife disturbance by recreational visitors
- Waterfowl habitat management
- Environmental Management Program
- Siltation and water quality
- Habitat for non-game migratory birds
- Facilities repair and upkeep
- Contaminant-free, abundant wildlife
- Hunting/fishing/trapping opportunities
- Land acquisition
- Interagency partnership and coordination
- Balance between the competing uses and users of the River
- Restoration of backwaters, side channels, and associated wetlands.



USFWS Photograph

Resource Management Today

Historically, the Mississippi River was an ever-changing system of sloughs, sandbars, and backwaters. Annual floods changed the course of the River, created new wetlands, deposited nutrient-rich sediments on forests and prairies, and provided spawning habitat for fish. The natural water level fluctuation provided a variety of rich habitat for a diverse number of wildlife species. As European settlement and development increased, Congress began authorizing a series of navigation channel improvements to be implemented by the COE. Eventually thousands of wing dams and closing structures were built to constrict the main channel and increase its depth. In the 1930s, a series of locks and dams were constructed to provide a reliable 9-foot-deep navigation channel for heavy barge traffic. These dams created a series of 26 navigation pools extending from St. Paul to St. Louis. The COE was also given flood control responsibilities and began building levees along the River.

These navigation and flood control projects dramatically altered natural water level changes in the River. Sediment from soil erosion has filled wetlands, reduced water clarity, destroyed fish spawning grounds, and prevented the growth of aquatic vegetation. Water circulation on many backwaters was limited and sedimentation increased, resulting in decreased diversity and abundance of vegetation. Hundreds of thousands of acres of floodplain forest and prairie have

been lost to agriculture and other development. Although some lands, such as the Mark Twain NWR Complex, are designated for protection of fish and wildlife, the overall amount and quality of wildlife habitat continues to decline.

Wetlands

Wetlands provide habitat for a wide variety of wildlife including ducks, shorebirds, marsh and wading birds, fish, reptiles, and amphibians. The vegetation in floodplain wetlands and the associated invertebrates provide important feeding and resting areas for migratory birds during fall and spring migration. Fish use flooded vegetation for spawning and feeding areas during spring high water events. The wetlands also absorb nutrients, sediments, and flood waters that otherwise would be carried downstream. These functions improve water quality and reduce flood height. Because of wetland conversion to agriculture and changes in natural flood/drought patterns on the UMR, the amount of wetland habitat and associated vegetation has decreased significantly. Some of this former wetland habitat has been restored on Refuge divisions within the Mark Twain NWR Complex including Louisa, Keithsburg, Clarence Cannon, Delair, and Batchtown. Wildlife managers have increasingly emphasized the importance of wetland restoration and management for healthy fish and wildlife populations.



Mark Twain NWR Complex Photograph

Water levels on some refuge wetlands can be manipulated to re-create the natural wet and dry cycles of the River. Wetlands are typically dried out in the summer to allow growth of beneficial wetland vegetation, then re-flooded in the fall to make the vegetation available to resting and feeding migratory waterfowl. However, operation and maintenance of pumps and water control structures can cost the refuges a great deal of time and money. Divisions within the Mark Twain Refuge Complex contain over 21 miles of ditches that deliver water to managed wetlands. Seven permanent pump stations permit lowering of water levels within units. More than 100 water control structures are used to manipulate water levels for optimal plant growth on more than 7,000 acres of wetlands. Significant structural losses and damages have occurred due to flooding and we must be cognizant of the need to construct “flood friendly” infrastructure within the floodplain.

Relatively little wetland habitat still exists within the AEC except within federal or state-managed areas and private duck hunting clubs. Even less acreage is managed as “sanctuary” for migratory birds. In non-hunted sanctuary areas, birds can rest and feed with minimal disturbance during their fall migration. At the present time, most of the available sanctuary is located within the boundaries of the Mark Twain Complex.

Forest

Forest habitats within the floodplain are used by many wildlife species including migrating and nesting songbirds, waterfowl, raptors, herons, egrets, deer, small mammals, reptiles, and amphibians. Floodplain forests support higher abundances of birds than upland forests, in some cases nearly double the abundance

(Knutson 1996, 1998). Species such as Brown Creeper, Yellow-billed Cuckoo, Yellow-bellied Sapsucker, and Great Crested Flycatcher show a clear preference for floodplain forests and a few species, such as Red-shouldered Hawk and Prothonotary Warbler, are dependent on these forests (Fitzgerald and Pashley, 2000).

The amount of floodplain forest within the AEC has been significantly reduced from historic levels. Where forest remains, it often has been fragmented into small parcels. In many reaches, most of the remaining forest is on islands. In addition, changes in flood frequency, duration, and depth resulting from impoundment and channelization have reduced the diversity within the remaining forests. Prior to European settlement, UMR floodplain forests were dominated by hackberry, elm, pecan, sycamore, willow, and cottonwood. Today, these forests are dominated by mature flood-tolerant silver maple. Less tolerant species, such as oaks, have significantly declined.

The Mark Twain Complex seeks to restore and enhance the amount and diversity of floodplain forest to meet the needs of forest-dependent wildlife. The three components of improved forest habitat within the AEC are (1) reduced forest fragmentation (increased size of forest blocks), (2) increased diversity of habitat within those forest blocks, and (3) adequate spatial distribution of forest habitat throughout the length of the River corridor.

The Service shares management responsibility with the Corps of Engineers for floodplain forests on General Plan lands managed by the Service and States for conservation. The COE's involvement could be at conflict with the Service if the COE managed its forest interest for economic purposes. However, during the past 20 years, it has become evident in the Mark Twain river reach that the COE is committed to restoring and maintaining a sound and diverse forest resource. Any economic value resulting from managed harvest has remained a secondary outcome realized from an active conservation-oriented program. Regularly scheduled coordination meetings between the COE, Service, and States have been effective in assuring that the program is compatible with Refuge Complex wildlife goals and objectives.

A specific forest management plan will be developed in partnership with Corps of Engineers foresters to achieve healthy floodplain forest diversity of adequate size and distribution. Management actions may include a selective harvest program in some areas to create early successional forest, diversity of canopy, and diversity of understory. Species diversity will be enhanced where feasible by planting oaks and other hard mast species. Forest fragmentation and spatial distribution will be addressed through a combination of land acquisition, conversion of former agricultural fields, and protection of existing forest tracts.

Agriculture

Beginning in the 1970s, the Service reduced emphasis on agriculture on national wildlife refuges and increased emphasis on wetlands and moist soil units to enhance species diversity and to provide a healthy diversity of diet for waterfowl. However, cropland management remains an important tool for managing refuges and for providing high-energy food for waterfowl and other wildlife. In addition, it provides managers a means to effectively set back invasion of woody vegetation in wetland units. Agriculture also can be used to maintain fields in an

open condition in preparation for conversion to another habitat type such as grassland, wetland, or forest.

The costs of a crop program are primarily administrative if cooperative arrangements are made with local farmers. This tool can only be used if it is economically beneficial to the farm partner. Cooperative cropland management requires staff time in pre-planning, farmer selection, and subsequent coordination. Once these tasks are completed, the farmer must deal with the difficulties of farming in the floodplain environment, which can include unpredictable river flood pulses. With the assistance of cooperative farmers, the Refuge Complex can secure supplemental food sources for wildlife and set back succession in wetlands without utilizing refuge labor, equipment, and supplies. At current staff and funding levels, most of these actions would not be possible without the assistance of cooperative farmers.

In the past, refuges within the Complex have knocked down crops away from hunted areas in order to make grain available to migrating waterfowl. During the mid-1990s, the baiting issue went through some controversy and changes. Since then, the Complex refuges have taken a more conservative approach to crop manipulations until waterfowl seasons are closed to ensure that flight patterns are not being influenced by grain on the ground during hunting season. However, during the past several years, late snow goose seasons have lasted through mid-March when most waterfowl have already migrated north. Some cropland reductions are proposed for the Complex, especially along border areas where baiting is a concern. If late seasons continue and crops cannot be made available to waterfowl during migration, additional cropland reductions might be implemented. This represents a CCP topic to be monitored closely and evaluated for future adaptive management strategies.



USFWS Photograph

Floodplain Management

Periodic flooding and drought are characteristic features of large floodplain rivers such as the Mississippi. These changing water levels are the major force responsible for maintaining the complex physical structure and rich plant and animal diversity of the River system. However, the navigation system and flood control levees have altered natural water level changes and isolated much of the River from its historic floodplain.

The Complex refuges use pumps and water control structures to mimic historic water level changes in areas that have some protection from unnatural river fluctuations. The berms that protect these managed wetlands from the River also help reduce the amount of sediment brought in by irregular flood regimes. However, berms and levees also can act as lateral dams, effectively eliminating the floodplain from normal high water, reducing the amount of fish spawning and nursery habitat, and potentially increasing flood heights downstream. On the other hand, unprotected backwaters and side channels are subject to high rates of sedimentation and rapid, irregular water level changes, resulting in loss of aquatic vegetation and deep water habitat.

The Complex will work with the states, COE, other organizations, private landowners, and the public to encourage a balanced floodplain management program on a system-wide level beyond the immediate refuge boundaries. Environmental pool management (EPM), for example, is an interagency partnership to modify dam operations for fish and wildlife benefits within entire navigation pools. Modification of water release schedules for navigation dams can benefit plants and animals over extensive reaches of the River and floodplain, beyond single moist soil units or even individual refuges.

The Mark Twain Complex will continue to be managed using an integrated approach to floodplain management. When making floodplain management decisions, managers will consider a range of desirable options including:

- Connecting the River to its floodplain.
- Reducing backwater sedimentation.
- Managing water levels to re-create natural wet/dry cycles.
- Reducing agriculture and facilities in flood-prone areas.
- Promoting partnerships and interagency coordination to encourage a balanced floodplain management program throughout the AEC.

Photograph by Bernie Angus



Prescribed Fire

Refuge managers use prescribed fire to enhance native prairie restorations and to alter vegetation composition in managed wetlands. Burns are done in early to mid-spring or in late summer to mid-fall. The timing and occurrence of burns are not always ideal, but are dictated by seasonal weather and flood conditions. With increased requirements for explicit burn plans, updated station fire plans, and higher levels of accreditation needed by refuge staff in order to execute prescribed burns, the cost effectiveness of this practice has decreased. In

order to effectively implement this tool, additional staff and funding are needed. Any future proposed fire management will first be evaluated and documented in a station fire plan.

Trapping

Trapping of furbearers is used occasionally as a management tool by Complex refuges to address infrastructure damage caused by muskrat and beaver. When populations become too high, muskrats often resort to burrowing into roads and dikes. Beavers block ditches and culverts, making water level management difficult or impossible and sometimes backing water onto private land. Trapping has been used one to three times at four divisions. Management action is based on a site evaluation of conditions at the time damage is occurring. Trapping is done by refuge staff when feasible. If it is decided that non-staff special use permit trapping will be utilized to address an occasional infrastructure problem, a site-specific evaluation will be documented.

Invasive Species

The Service has made prevention and control of invasive plant and animal species a top priority. Invasive species cause vast ecological and economic damage and range across almost every ecosystem in the country. More than 135 non-native

species have been introduced to the Mississippi River basin during the past 100 years including zebra mussels, purple loosestrife, and bighead carp.

Many units of the Mark Twain NWR Complex have noxious and exotic weeds that are controlled biologically, mechanically, or chemically. Chemical use has been greatly reduced on Complex lands, but is still needed in some instances to control invasive plants. Chemicals are considered after first attempting to eradicate the problem by other means. Preferred methods include burning, mowing, or disking.



Mark Twain NWR Complex Photograph

Fisheries biologists believe that Asian carp species (silver, bighead, grass, and black) may be more threatening to the UMR ecosystem than the common carp because they compete more directly with native fish and shellfish for food and habitat. The bighead carp feeds on zooplankton, which places it in direct competition for food with native paddlefish, bigmouth buffalo, and gizzard shad. Grass and silver carp are fast approaching the bighead's numbers and also have the ability to capitalize on degraded habitat not preferred by native species.

Threatened and Endangered Species

Federally-listed threatened and endangered species that have been found within the AEC include Indiana bat (*Myotis sodalis*), pallid sturgeon (*Scaphirynchus albus*), Bald Eagle (*Haliaeetus leucocephalus*), interior Least Tern (*Sterna antillarum athalassos*), decurrent false aster (*Boltonia decurrens*), and several species of freshwater mussels. Where practical, strategies have been identified to improve habitat conditions for these species.

Land Preservation Component

“Even before the Great Flood of '93, we had started to realize that some of the areas within our levees should have never been cleared for farming. The events of the last year have driven this point home. Many farmers with marginal and submarginal land are tired of fighting the river and want to find a way to get out from under their financial burdens.” *Letter from Union County Board of Commissioners To U.S. Senator Paul Simon (IL), April 1994*

Perhaps the most significant management issue considered in the draft CCP is the associated proposal to expand the boundaries of the Refuge Complex. The preferred alternative described in the draft environmental assessment, Alternative A, includes a land preservation component. (See the “Management Alternatives” section.) A 27,659-acre expansion proposal has been included in the comprehensive conservation planning process. While this expansion represents a notable effort, the total area identified is modest when it is considered within the context of a more than 1.3-million-acre planning area.

The concept of identifying habitat needs spread over 493 miles of the Mississippi River to the Complex's potential acquisition boundary originated in the early 1990s, when the Service initiated efforts to examine a larger section of the Upper Mississippi River corridor. This evaluation included the "Middle Mississippi River" (local name for the lower 200 miles of the Upper Mississippi River), which had not been included in earlier efforts.

In response to the Great Flood of 1993, the Service prepared a Big Rivers Ascertainment Initiative that proposed strategies for evaluating lands for the protection and restoration of sustainable representative habitats along the Illinois, Missouri and Mississippi rivers. There was also a smaller, more focused Preliminary Project Proposal prepared for four disaster areas in the Middle Mississippi River in response to the flood. Congress funded the Service for this land acquisition as part of a broader federal strategy to assist flood prone farm landowners, improve river resource values, and to restore some floodplain function. This effort was initially referred to as the Tanahkwe District of the refuge, but the unit was not staffed as a separate station at the time. Approximately 4,000 acres of the land within these four units was purchased in 1996-1997. The Shawnee National Forest also acted to address the flood issue by purchasing some of the Wetland Reserve Program (WRP) easements on floodplain lands and has evaluated a proposal to extend the National Forest boundary westward to the River's edge between Grand Tower and Thebes. This effort has been called the Inahgeh addition to the forest. The American Land Conservancy has worked in partnership with the Shawnee National Forest since the start of the post flood project and has been working with the Fish and Wildlife Service on its biological program for the past several years. The existing government/non-government joint endeavor along the Forest Service reach of the Middle Mississippi River is the reason the CCP land protection area was adjusted to exclude this section of the historic floodplain.

In 1997, final approval was obtained from the FWS Washington Office to study the potential addition of up to 60,000 acres to the Mark Twain NWR Complex. Since the CCP planning effort was scheduled to begin soon, it was decided that the detailed evaluation of the expansion would be incorporated into the station comprehensive plan. Specific parcels were identified by evaluating those locations that best contribute to the goals and objectives outlined in this plan. Potential lands were placed in a tiered priority order, with the highest priority tier (total approximately 27,700 acres) becoming the boundary proposal within the Selected Alternative of the Environmental Assessment for this plan. Acquisition and subsequent implementation of habitat restoration efforts on these lands represent essential strategies to achieving plan goals and objectives within the 1.3 million-acre planning area.

Considerations for selecting specific parcels and their priority in this expansion include:

- Refuge purposes;
- The goals and objectives of the CCP;
- Interagency input, such as the jointly prepared Middle Mississippi River Habitat Rehabilitation Initiative, and other habitat focus areas, such as the Environmental Pool Management effort in Pool 25;
- the sites' potential to restore riverine wetland and forest values;

- Levee District flood histories;
- The Habitat Needs Assessment (HNA) developed by the COE, Service, U.S. Geological Society and five Upper Mississippi River states; and
- The opportunity to remove agriculture from the most flood prone and erodible areas.
- providing additional recreational access in areas where existing access is limited

If completed, the expanded project will not only contribute to the goals of the CCP, but these lands will also assist with public policy matters addressed by other federal, state, and local agencies. Nutrient cycling on additional floodplain lands will contribute to the reduction of nitrogen flowing down the River and a subsequent reduction in Gulf Hypoxia. By opening the width of the floodplain and increasing floodwater storage, the potential damage to urban areas and other developed and protected lands is reduced. Also, some flood prone farmlands have been more expensive to the government through disaster relief payments in recent years than the fee value of the land to purchase. The increase of public recreational opportunity is another positive along with the primary goal of restored habitat values.

Much of the land within the proposed boundary is located in the Middle Mississippi River reach of the UMR. Very little public ownership exists there and floods have been particularly hard on floodplain farmers in that portion of the river. Most of the lands there will be managed for forest and aquatic habitats. The forests will provide a contiguous corridor for nesting and migrating birds and aquatic habitats will be managed for the benefit of big river fish. Expansions of the flood zone will contribute to the floodplain management and water quality goals. An exact prediction of the habitat types that will result in any area cannot be made until the areas have been acquired and various detailed options can be explored on-site. However, it is estimated that locations of the expansion above St. Louis will result in habitat types that are proportioned close to the distribution that now occurs in those refuges. This distribution generally being; forest types 50 percent, wetland and aquatic types 30 percent, and other terrestrial types 20 percent. Since there will be an increased emphasis on connectivity rather than isolated wetlands in the Middle Mississippi River section, the proportions there are estimated to be 65 percent forest, 20 percent wetland, and 15 percent other terrestrial habitats.

The initial delineation of the proposed boundary was accomplished using refuge Geographical Information System (GIS) data, which is used primarily for biological analysis at the refuge. As such, the potential units listed by this means totaled 31 areas containing approximately 134 landowners. The total acreage of the 31 separate areas equals 27,659 acres. However, that acreage figure may be high because it contains some parcels that include open water areas between fee title lands, such as backwater channels within an island complex. These figures will be refined by means of a tract-by-tract evaluation of the parcels as they are recorded in county courthouses.

During the 15-year planning period outlined in this plan, it is not expected that the Complex will actually acquire an interest in all the lands included in the proposed boundary. It is recognized that under normal budget conditions, acquiring 12,000 to 15,000 acres is a realistic estimate during the 15-year plan

period. However, it is still important to plan for a larger project area. The needed habitat for a sustainable system is estimated to be an additional 130,000 acres, according to the HNA. Partner agencies, particularly the COE, have looked to the Fish and Wildlife Service to identify the highest priority lands for meeting sustainable system needs. The areas identified in the CCP boundary expansion proposal, including tiers 2 through 4, will also be used by those partners as specific resource information along the corridor in the event of another disaster mobilization. It is anticipated that other authorities, such as the COE or FEMA, could be used to purchase lands in the event of another flood on the scale of 1993. Other opportunities are possible, such as purchase of lands by the COE for

Environmental Management Program projects. The proposed boundary will help delineate the highest priority areas for system scale resource attention.

It is estimated that the cost to acquire nearly 28,000 acres would be anywhere from \$20 million to \$27 million. Since acquisition would only be on a willing seller basis, it is likely that if this acquisition were to occur, it would be over a period of decades. The estimate for the 15-year planning period is \$13 million for the 12,000 to 15,000 acres. Public and private partnerships will be utilized to reduce this cost to the Service.

USFWS Photograph



The estimate for long-term Operations and Maintenance funding needs to manage these lands is relatively low for two reasons. First, most of the land will simply be opened to the River and farming practices stopped. Subsequent much of the forests and wetlands will develop naturally under those conditions. Posting will be required and additional law enforcement coverage may be needed to accommodate the additional public use on the expanded refuge areas. The second reason O&M costs will be lower than normal situations is the presence of partnerships in place on the River. Lands that contain a particularly high restoration value if some level of development is applied can be achieved through programs such as the COE's EMP, or other authority to improve environmental conditions on the River. In all instances, the "forces of the river" will be employed in attempts to mimic natural conditions and reduce O&M costs wherever possible.

The complete Land Protection Plan is Appendix M of the draft CCP and is on the Web at: <http://midwest.fws.gov/planning/marktwaintop.htm>.

Management Alternatives

A draft environmental assessment has been prepared that evaluates the potential impacts of management alternatives for the Refuge Complex. Four alternatives are evaluated in the draft environmental assessment, each centered on different levels of flood protection/river connectivity and additional land protection measures through acquisition or partnership. They are described in the following paragraphs.

Alternative A: Expanded boundaries, increased River connectivity: Restore Riverine Habitat for Migratory Birds and Indigenous Fish and Increase Floodplain Functions Such As Connectivity and Flood Water Storage Via Expanded Boundary and Adaptive Management Techniques (Preferred Alternative)

Briefly: Broaden Refuge Complex opportunities both to expand river/floodplain connectivity and to manage for habitat diversity for fish and wildlife resources on the Upper Mississippi River System through land acquisition (an expansion of up to 27,659 acres over currently authorized boundaries) and use of adaptive management techniques within the 500-year floodplain of the Area of Ecological Concern.

The current divisions of the Complex have varying amounts of water level control, flood control, and floodplain connectivity. Some divisions are completely open to the River and its flood pulses; others are partially protected by levees with spillways; and two divisions (Louisa and Delair) receive protection from major levees constructed by the COE and private agricultural drainage districts, respectively, prior to Service acquisition.

Refuges in the Complex are managed using an integrated approach to floodplain management. When making floodplain management decisions within the AEC, each refuge manager considers a range of desirable options including:

- Connecting the River to its floodplain.
- Reducing backwater sedimentation.
- Managing water levels to recreate natural wet/dry cycles.
- Reducing agriculture and facilities in flood-prone areas.
- Promoting partnerships and interagency coordination to encourage a balanced floodplain management program throughout the AEC.

Under Alternative A, refuge staff would continue using this approach on lands within the Complex. All of these options cannot be applied to every refuge and division. The lands would be managed to accomplish the previously stated Complex goals. Decisions on how to manage each unit are based on local and system-wide habitat needs, area elevation, geomorphology and landscape features, authorized purposes of the unit, political and social considerations, and funding limitations.

Considerations to this alternative include impacts floodwaters would have on private land surrounding each refuge division. The Service cannot alter the drainage of water from private land, nor allow private land to be flooded by its management actions. Conversely, the Service has no obligation to implement extraordinary measures to protect adjacent property unless appropriate legal arrangements are made.

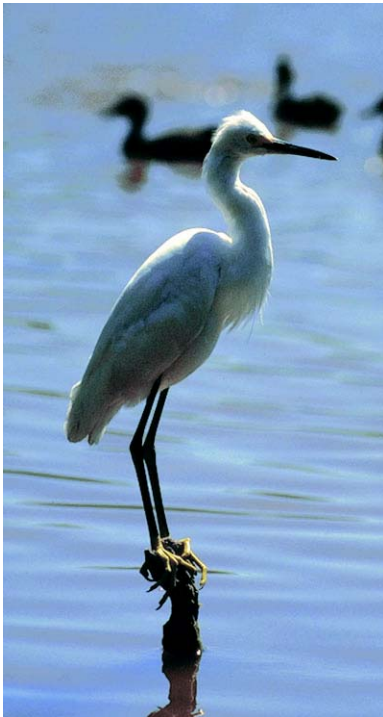
Allowing floodplain lands to reconnect with the River may involve opening any Service-acquired levees or drainage outlets that restrict free flow onto or through the acquired lands. When such alterations are considered, they would be coordinated with the COE and made compatible with the operations of adjacent private landowners or levee/drainage districts, and done in accordance with National Environmental Policy Act (NEPA) guidelines.

The Complex staff has developed priorities for additional land acquisition within the planning area. One factor that was considered in selecting priority tracts is the potential to restore River connectivity. Complete connectivity provides fisheries access and floodwater storage, but gives managers little or no ability to control water levels and often results in high rates of sedimentation.

Additional staffing and funding would be needed with implementation of Alternative A. Also under this alternative, additional public use opportunities would be created by acquiring additional floodplain lands, and enhanced on current divisions. New nature trails, observation platforms, information kiosks and boardwalks would offer educational opportunities to the public. Visitor centers, contact stations and exhibits would be constructed and/or enhanced to provide optimal outreach efforts. Additional hunting, fishing and non-consumptive wildlife uses would be implemented where biologically compatible. Monitoring would assess biological changes to the floodplain following land acquisition and implementing adaptive management techniques.

Alternative B: Current Program: Current Management Strategies and Acquisition Within Existing Boundaries (No Action)

Briefly: Limit the Mark Twain NWR Complex land acquisition to completing the currently authorized boundaries. Current management strategies would continue.



USFWS Photograph

Under Alternative B, the Complex would continue to operate under the same general framework with no changes made to programs outlined under Alternative A. Land acquisition would be limited to currently approved boundaries along the lower 200 miles of the UMR from a previous expansion approved following the Flood of 1993. Refuge staff would maintain best possible management in all programs on the current acreage, with no additional staff or funding. Program improvements would remain a high priority, but would only be accommodated as limited staffing, funding and time permits.

The Complex would continue to operate using the current management strategies but opportunities to enhance river/floodplain connectivity or habitat management ability would be minimal.

Opportunities for wildlife observation and photography, hunting opportunities, and fishing opportunities would be maintained at existing levels. The quality of existing environmental education and interpretive programs would be improved with the improvement of existing facilities.

Alternative C: Existing boundaries, maximum River connectivity: Increase River Connectivity Via Spillways, Levee Breaches, and Acquisition Within Existing Boundaries

Briefly: Increase river/floodplain connectivity by reducing effectiveness of existing protective levees, even at the cost of increased sedimentation and loss of water level management capability. There would be no expansion of authorized Refuge boundaries.

Eight divisions are currently open to all River fluctuations. That is, as River levels rise and fall, so does the water level within Big Timber, Horseshoe Bend, Fox Island, Long Island, Portage Islands, Harlow Island, Meissner Island and

Wilkinson Island divisions. Several divisions provide some protection from small, River-level fluctuations, but during flood events, become contiguous with the River (Keithsburg, Gilbert Lake, Batchtown Divisions, Clarence Cannon NWR). Swan Lake on the Calhoun Division maintains connectivity through its lower unit, while the middle unit is designed to annually overtop by floodwaters. Two divisions, Delair and Louisa, are isolated from the Mississippi River by tall levees. The levee bordering Delair Division is a privately owned agricultural levee, and cannot be breached, while the levee bordering Louisa Division is owned by the COE. The Louisa Division and associated Lake Odessa State Wildlife Area can be selectively open or closed to the River through large gates, providing water control capabilities and fish passage.

Implementation of Alternative C would allow the Mississippi River complete access to its floodplain on all Complex lands, except Delair Division. Where levees or berms currently exist, e.g., Louisa, Gilbert Lake, Keithsburg, etc., deep notches or spillways would be cut to allow the River access to its floodplain. On the Clarence Cannon NWR, the existing spillway would be lowered to provide greater access to the River's water level fluctuations.

Alternative C would decrease habitat quality on refuge lands and waters due to increased sediment deposition and loss of ability to re-create the historical water level fluctuations critical to effective fish and wildlife habitat management in the floodplain.

Considerations to this alternative again include impacts flood waters would have on private land surrounding each refuge division. As stated under Alternative A, the Service cannot alter the drainage of water from private land, nor allow private land to be flooded by management actions. Conversely, the Service has no obligation to implement extraordinary measures to protect adjacent property unless appropriate legal arrangements are made.

It is anticipated that Service owned lands acquired under either Alternative A or C would be opened to River flows in some capacity, thereby providing flood storage that could have a cushioning effect on flood magnitudes. This mitigative effect would be mostly local and applicable only in small to moderate flood events. Acquisitions within levee districts may provide enhanced opportunities for habitat management.

Under Alternative C, opportunities for wildlife observation and photography, hunting opportunities, and fishing opportunities would be maintained at existing levels. The quality of existing environmental education and interpretive programs would be improved with the improvement of existing facilities.

Alternative D: Existing boundaries, least River connectivity: Enhance Habitat Protection Via More Flood Protection, Less River Connectivity on Refuge Lands Within Existing Boundaries

Briefly: Increase flood protection on existing lands in order to increase effectiveness of habitat management practices on wetlands, grasslands, and bottomland forests, even at the cost of reduced River connectivity.



USFWS Photograph

As previously mentioned, many divisions provide some level of levee protection from rising River waters. Under Alternative D, berms or levees would be built up to protect nine divisions and Clarence Cannon NWR from the River's fluctuations. For instance, Gilbert Lake and Batchtown divisions currently have spillways cut into their berms, allowing floodwater to slowly fill the units. Alternative D would provide an opportunity to build these berms up, fill in the spillways, and prevent the River from accessing its backwaters, unless by excessive flooding. Enhanced habitat management in these units would be attained with this action.

Development of Alternative D on newly acquired lands within currently approved boundaries would provide additional habitat management and public use opportunities; however River connectivity would be greatly diminished by exercising this alternative.

Opportunities for wildlife observation and photography, hunting opportunities, and fishing opportunities would be maintained at existing levels. The quality of existing environmental education and interpretive programs would be improved with the improvement of existing facilities.

Future Management Direction

The goals established for the Mark Twain National Wildlife Refuge Complex seek to address the issues raised by the public, states, other agencies, the Service's Regional Office, and Refuge Complex staff. The draft CCP includes objectives for achieving each goal, and strategies for achieving each objective. Goals established for the next 15 years include:

- Goal 1** Wetlands and Aquatic Habitat: Restore, enhance, and manage refuge wetland and aquatic areas to provide quality diverse habitat for waterfowl, shorebirds, big river fish, and other wetland-dependent species.
- Goal 2** Forest Habitat: Conserve and enhance floodplain forest to meet the needs of migrating and nesting neotropical birds and other forest-dependent wildlife.
- Goal 3** Other Terrestrial Habitats: Protect, enhance, and restore other terrestrial habitats (grassland, wet meadow, scrub/shrub) to benefit grassland birds, waterfowl, and neotropical migrants.
- Goal 4** Sedimentation and Water Quality: Identify and reduce the impacts of sedimentation and other water quality factors, such as contaminants, on fish and wildlife resources.
- Goal 5** Floodplain Management: Enhance floodplain functions and, where practicable, mimic historical water level fluctuations in the River corridor.
- Goal 6** Public Use and Education: Provide wildlife-dependent recreation opportunities where appropriate, and improve the quality and safety of the recreational experience. Enhance environmental education and interpretive efforts by developing and improving refuge programs and facilities, and partnering with others to increase awareness of the Mark Twain NWR Complex, the Mississippi River, and the National Wildlife Refuge System.

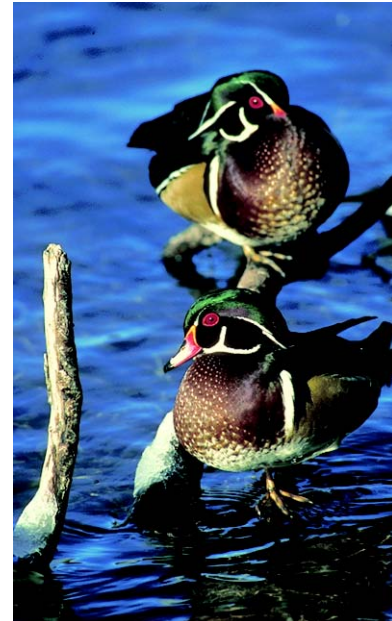
Goal 7 Monitoring: Develop and implement a wildlife, habitat, and public use monitoring program, integrated with interagency efforts along the River corridor, to evaluate the effectiveness of refuge management programs and to provide information for adaptive management strategies.

As an integral part of the Upper Mississippi River System, the Refuge Complex needs an organized approach to consider how it fits and contributes to larger River values, as well as identifying the best opportunities for reversing habitat declines outside current refuge boundaries. The Complex started this planning effort on the Mississippi River as a watershed issue, however, the resulting “planning area” would have included a good portion of the continent. While it is helpful to consider all the cause/effect actions within the entire watershed, such as farming practices that accelerate runoff, this macro-scale view is clearly beyond the management capability of Complex staff. A more manageable approach is to outline the 500-year floodplain between the Quad Cities (Illinois/Iowa border) and the confluence of the Ohio River (River Mile 493 to River Mile 0). This area covers about 1.6 million acres.

The floodplain area was further modified, as appropriate, to accommodate the practical limits of Refuge habitat concerns. For instance, highly developed areas such as towns are obviously not the most suitable locations for riverine habitat restoration and were excluded from further consideration. A revised map to reflect such changes was created and defined an Area of Ecological Concern (AEC) for refuge planning purposes. The AEC totals approximately 1,300,000 acres and extends from River Mile (RM) 493 at Lock and Dam 15 to RM 0 on the Illinois side. The AEC relates to the practical limits of Complex evaluation of floodplain areas for possible restoration activities, including potential land acquisition.

Although the plan is habitat based, Complex lands and waters are managed for wildlife. Decisions had to be made about which wildlife species or groups to consider in determining which habitats to promote. To help focus this decision process and to ensure that a broad diversity of wildlife needs were considered on the appropriate landscape scale, a “Species Priority List” was generated for the Mark Twain National Wildlife Refuge Complex. These species were selected by “funneling down” the Fish and Wildlife Service Resource Priorities List for Region 3 to include all those priority species found within the planning area (AEC). The resulting list was further modified by considering Refuge purposes, species historic range, habitat types found within the AEC, and whether there were major voids or duplications. The Refuges within the Complex are not managing exclusively “for” these species. This planning process studiously avoided any single-species management directions. Species on the Priority List can be considered representatives of guilds or other groupings of species that are dependent on a particular type of habitat. For that reason they provide an identifiable link between a wildlife species and its associated habitat managed by the Complex. Establishing these associations during the planning process will help in future monitoring activities and adaptive management decisions.

The Complex Species Priority List contains one mammal, 15 birds, two fish, and one mussel guild. The List includes the following species:



USFWS Photograph

Birds

American Bittern	Canada Goose
Wood Duck	Mallard
Blue-winged Teal	Canvasback
Lesser Scaup	Bald Eagle
Red-shouldered Hawk	Least Tern - interior population
Cerulean Warbler	Grasshopper Sparrow
Henslow's Sparrow	Short-billed Dowitcher
Yellow-billed Cuckoo	

Fish

Pallid Sturgeon
Paddfish

Mussels

Sheepnose	Salamander Mussel
Round Pigtoe	Rock Pocketbook
Pistolgrip	Monkeyface
Higgins' Eye Pearlymussel	Fat Pocketbook
Black Sandshell	

How the CCP Affects Complex Refuges

As a result of changes planned and documented in the CCP, Refuge Complex habitats will be managed in a different proportion from the 1989 systemic coverage to the desired future condition in 2015. The **following figures** do not include lands within the proposed boundary or refuge lands outside the AEC at Apple Creek (Two Rivers) and the Iowa River Corridor Project (Port Louisa). Open water areas will be reduced from 5,200 acres to 2,900 acres. This is largely due to the conversion of Swan Lake (Two Rivers NWR) from a backwater with a flocculent bottom and no aquatic vegetation to a harder bottom wetland that will support aquatics (primarily permanent and semi-permanent flooded emergents). The conversion will be the result of an Environmental Management Program (EMP) project that permits periodic drawdown. Within the Complex, all wetland types will increase by 4,500 acres to a total of over 9,000 acres. Forest habitats will increase by 4,630 to a total of 18,460. Grasslands increase from 725 to 1,900 acres. Agriculture decreases from 9,100 to 1,100 acres. Much of this agriculture conversion is due to areas acquired since 1989 being restored to one of the above type habitats after purchase, along with a substantial shift in previous refuge management practices. However, farming continues to be an invaluable management tool for periodically setting back wetlands types, such as seasonally flooded emergent (moist soils). Scrub/shrub (875 acres), sand/mud (185 acres) and developed area (20 acres) cover types are changed very little due to the proposals.

Public Use and Education

The 1997 Refuge Improvement Act states that the primary purpose of the National Wildlife Refuge System is wildlife conservation. In addition, Congress recognized that certain public uses should take priority over other public uses when they do not detract from the primary purpose of wildlife conservation. These priority wildlife-dependent recreational uses are hunting, fishing, wildlife observation and photography, and environmental education and interpretation.

Not every division in the Complex is open to all six wildlife-dependent public uses. Some divisions are open year-round for public use (e.g. Big Timber, Long Island), while Delair Division is closed year-round as a condition of its acquisition from the previous owners. Many of the divisions are closed to public access in the fall and early winter to provide sanctuary for migratory birds. Each refuge headquarters has an inadequate visitor contact station, and public use and education activities account for no more than 10 to 15 percent of staff duties at current staffing levels. In general, the only sites where interpretive panels are currently found include refuge headquarters and trails on higher ground. In this plan, new observation decks and interpretive signs are being proposed at several divisions at optimal, higher elevations where floods will cause minimal damage. All refuges within the Complex also propose to enhance environmental education programs, develop new interpretive brochures, increase volunteer programs, and establish Friends Groups.



Mark Twain NWR Complex Photograph

Monitoring

The monitoring priorities of the Complex will focus on data pertinent to Service policies and management objectives of the refuge divisions. Priority surveys will focus on the Mark Twain Complex species of concern and their preferred habitats. In addition, there are numerous other partners involved in monitoring efforts conducted within the AEC including COE, USGS, and state natural resource agencies. The Complex will integrate these larger-scale River corridor monitoring efforts with refuge site-specific data to the degree applicable. The Complex will develop a step-down inventory and monitoring plan for wildlife, habitat, and public use. A well-designed monitoring program will improve refuge management by focusing limited resources on specific management questions and enabling decision-making based on adaptive management. The Complex will use new information to assess and modify management strategies needed to achieve overall goals and objectives. Individual refuges will implement minor modifications if warranted by changing circumstances. Any major modifications of program direction will be reflected in formal revisions of this CCP.

Port Louisa NWR

Port Louisa NWR is based near Wapello, Iowa, and is the northernmost of the refuges. Refuge staff manage four divisions: Louisa, Big Timber, Keithsburg, and Horseshoe Bend, totaling approximately 8,400 acres.

Louisa Division

The 2,600-acre Louisa Division is protected from average to moderate flooding by a COE levee. However, seep water from the navigation pool makes some units in the Division difficult to manage. Lake Odessa State Wildlife Area borders Louisa Division on the south. The two areas share water control structures at the north end of Louisa (inlet from the River) and the south end of Odessa (outlet). A boat ramp allows public access directly to the River. Port Louisa Refuge headquarters is located on 48 acres of wooded bluff on the west side of the Division.

Proposed CCP strategies call for an enhanced water delivery system, construction of a levee spillway to reduce future flood damage, and conversion of agricul-

tural lands to wetland and prairie habitats. Proposed public use enhancements include an expanded headquarters/visitor contact area, and improved exhibits and outdoor classroom facilities. Closure dates of Louisa Division for waterfowl sanctuary will be changed to September 16-December 15 to protect migrating waterfowl. A “no wake zone” for boaters will be established within the Division to reduce shoreline erosion, water turbidity, and wildlife disturbance.

Keithsburg Division

The 1,400-acre Keithsburg Division is located between RM 428-431 in Illinois. A 3-mile-long levee separates Keithsburg from the Mississippi River. Spillways are located at the north and south ends of the Division to provide River connectivity during periods of high water. A pump station on the levee was damaged by flooding in 1993 and is non-functional. Summer drawdowns for growth of wetland vegetation are dependent on gravity flow of water. Forest stands were severely affected by the Flood of 1993 and many snags now exist. Fishing is the primary public use on the Division and a boat ramp provides public access. Proposed strategies for Keithsburg include improved water control, and dredging to increase deep-water fisheries habitat. Interpretive panels will be installed at the boat ramp and the closure period for waterfowl sanctuary will be changed to September 16-December 15. A “no wake zone” for boaters will be implemented.

Big Timber

The 1,750-acre Big Timber Division is located north of Louisa Division in Iowa. Most of the Division is a series of islands, consisting of sloughs surrounded by bottomland hardwood forest. It is not protected by a levee and is completely open to the River's fluctuations. Deep water habitat was created in the early 1990s by dredging, but since project completion a great deal of sedimentation has occurred in the dredge cuts. A Refuge boat ramp on the mainland provides public access. Big Timber is open to waterfowl hunting, but fishing is the primary recreational activity. Proposed strategies call for habitat restoration at Turkey Island, improvement of the boat landing, installation of interpretive panels, creation of a “no wake zone,” elimination of the drawing for permanent waterfowl hunting blinds, and restrictions on permanent blind construction.

Horseshoe Bend

Horseshoe Bend Division is located in the Iowa River floodplain about 4 miles upstream of the Mississippi River confluence. Levee breaches that occurred prior to Service acquisition will not be repaired, so the Division remains open to River fluctuations. Approximately 400 acres of wetland have been restored, 50 acres of hard mast tree species have been planted, and 250 acres of former cropland have been seeded with native grasses and forbs. The Division contains the largest block of grassland/wet meadow habitat in the AEC. Prescribed burning is an important management tool. Proposed strategies include development of an overlook at Rush Lake, an interpretive trail and parking area on the east side of the Division, a no-wake-zone for boaters, and modification of the waterfowl sanctuary period to September 16-December 1.

Two Rivers NWR

Two Rivers NWR totals about 8,500 acres and is located near the confluence of the Mississippi and Illinois rivers. The Refuge includes five divisions. Calhoun



USFWS Photograph

Batchtown, Gilbert Lake, and Portage Islands are located in the AEC but the fifth, Apple Creek, is outside the planning area and is not included in this CCP.

Calhoun

Calhoun Division stretches along the Illinois River from approximately RM 5 to 10. The 4,800-acre Division is comprised of the 2,300-acre Swan Lake in addition to wetlands, forests, agriculture, grassland, and Refuge headquarters. Fuller Lake State Wildlife Management Area adjoins the Division on the north side. A recently completed restoration of Swan Lake included dikes, pump stations, water control structures, and island construction. Historic water level fluctuations can now be re-created periodically on the lake to consolidate flocculent bottom sediments and promote the growth of wetland vegetation. In most years, the lower portion of the lake will be open to the River for fish passage. Two boat ramps are available for public access to Swan Lake.

Proposed future management strategies include wetland enhancement, conversion of some croplands to forest, wetland, and prairie, and monitoring of migratory bird use on remaining agricultural fields. The Refuge also plans to expand the headquarters and visitor contact building, improve exhibits, construct interpretive trails and overlooks, and develop an annual wildlife celebration in Calhoun County. The road leading to the lower Swan Lake pump will be opened to vehicle traffic, and a fishing pier and transfer dock will be installed near the boat ramp. Lands east of Illinois River Road will be opened to upland and big game hunting. The closed waterfowl sanctuary period will be changed to October 15-December 31 each year.



Mark Twain NWR Complex Photograph

Gilbert Lake

Gilbert Lake Division is adjacent to Pere Marquette State Park on the Illinois River. The Division totals about 735 acres including a lake bordered by forest, grassland, and small agricultural fields. A low levee with spillways prevents irregular water level fluctuations and the pump was replaced recently, which will improve the ability to re-create historic wetland conditions on the lake. Gilbert Lake is one of the few remaining places where decurrent false aster (*Boltonia decurrens*), a federally-listed threatened plant, can still be found. Proposed future plans call for lake dredging to improve water management, wetland enhancements, and conversion of an agricultural field to bottomland forest. Public use plans include an observation deck just off the highway to provide a view of the lake. The closed waterfowl sanctuary period will be changed to October 15-December 31 each year.

Batchtown

The 2,300-acre Batchtown Division lies between RM 246 and 251.5 on the Illinois side of the Mississippi River. Part of the Division, known as Prairie Pond, is separated from the River, making limited water level management possible during non-flood periods. More than half of the Division is open to river flood pulses and consists of a network of islands, side channels, and backwaters. The Division is bordered on the north by Red's Landing State Wildlife Management Area and on the south by Batchtown State Wildlife Management Area. There is one Refuge boat ramp at Prairie Pond and another accessing the Mississippi River backwaters at Gilead. Improvements in pumps and water control structures, together with dredging to remove accumulated sediment, will enhance the Refuge's ability to manage the Prairie Pond wetlands. Encroaching willows will

be pushed back from wetland edges. Backwater sloughs in the upper portion of Batchtown (Church, Gilead, etc.) will be evaluated for habitat improvement needs. The closed waterfowl sanctuary period will be changed to October 15-December 31 each year.

Portage Islands

The 230 acres of Portage Islands Division are comprised of one large and three small islands in Pool 26 of the Mississippi River, RM 213-214. Boaters use the beaches during summer months. Illegal camping and campfires destroy vegetation on the islands each year. Much bank erosion and island loss has occurred. Future plans include construction of rock revetments or hard points to promote island growth, protect island heads, and prevent further erosion and loss of mature forest. The closed waterfowl sanctuary period will be changed to October 15-December 31 each year.

Great River NWR

Great River National Wildlife Refuge manages approximately 13,900 acres spread out over 100 river miles along Pools 20, 21, 24 and 25. The Refuge is comprised of Fox Island, Long Island, and Delair divisions plus Clarence Cannon NWR.

Fox Island (formerly Gregory Landing Division)

Fox Island is the northernmost division of Great River NWR, located in Missouri, about 5 miles south of Keokuk, Iowa. The Fox River runs through Fox Island Division and empties into the Mississippi River at the southern tip. A portion of the western boundary touches the state-owned Rose Pond Conservation Area. Only 90 acres of the 2,100-acre Division are protected by a levee. Wetland restoration within Fox Island Division is difficult due to the porosity of the soils and lack of water level control, but three remnant sloughs have been partially restored by blocking agricultural drains with water control structures. Oaks and pecans have been planted on about 240 acres of former agricultural land. Approximately 675 acres are still planted annually with corn or soybeans in order to keep the land clear for planned reforestation. Reliable public access is very limited due to almost a complete lack of public roads and by the River's fluctuations. Planned management strategies include conversion of marginal crop fields to forest, installation of wells, if practicable, to enhance wetland management, planting of native grasses on the Logsdon tract adjacent to Rose Pond, interagency coordination to improve public road access, and evaluation of the potential for developing a boat ramp and parking area at the Lone Star Bridge site.

Long Island (formerly Gardner Division)

Long Island Division is located 6 miles north of Quincy, Illinois, at RM 333-340, and is comprised of 6,300 acres of unleveed islands, forest, sloughs and ponds. Long Island is the longest contiguous forest south of Rock Island, Illinois. The mature size and diversity of trees also makes Long Island unique. Sedimentation in side channels and sloughs has greatly reduced depth, limited boat travel, and reduced the quality of recreational fishing. The State of Illinois manages waterfowl blinds through its 2-year permit allocation cycle. The COE manages the Bear Creek Recreation Area, which is adjacent to the Division and provides a public boat ramp and campground. In recent years, several hundred acres of former farmland have been planted with bottomland hardwoods or allowed to

reforest naturally. Eroding islands are being stabilized and dredging has re-created deep water habitat in O'Dell Chute. Future plans include completion of island stabilization, tree planting on remaining fields, and investigation of the feasibility of dredging at the opening of Long Island and Indian Graves lakes.

Delair

The 1,740-acre Delair Division extends from RM 277-282 in Pike County, Illinois. The Division lies completely within the Sny Agricultural Levee District and is separated from the River by the main line Sny Levee. The sandy soil and low elevation causes constant water seepage into the Division from the River. Approximately 450 acres are managed as wetlands and 350 to 400 acres are still farmed annually. Delair Division is closed to most public entry as a condition of the original purchase agreement. However, environmental education programs are provided for school groups and a special hunt has been conducted each January since 1995 to control the burgeoning deer population. Planned management strategies include conversion of some agricultural lands to wetland and forest, enhancement of existing wetlands, construction of a vehicle turnout with interpretive signs along the public road near the Gosline boat access, and public open houses at Delair every 3 years.

Clarence Cannon

Clarence Cannon NWR lies between RM 261 and 264 in Pike County, Missouri. The headquarter for Great River NWR is located on Clarence Cannon. All but a few hundred acres are protected by a levee. A spillway was constructed in the levee top following the 1993 flood to allow more frequent controlled flooding of the Refuge. The 3,750-acre Refuge contains 2,200 acres of actively managed moist soil units, about 450 acres of bottomland forest, and 400 acres of annual cropland. Proposed future management strategies include construction of a second pump station and the addition of wells and water control structures to enhance wetland management, and planting of hard mast trees to create green tree reservoirs. Other plans call for an expanded headquarters and visitor contact area, improved interpretive exhibits, and development of an auto tour route and nature trail. A special deer hunt has recently been opened to help control the population.

Middle Mississippi River NWR

The Middle Mississippi River NWR planning area begins below Lock and Dam 26 at St. Louis, Missouri, and continues to the confluence of the Ohio River near Cairo, Illinois. There are no locks and dams in this reach, but the River has been confined to its main channel by rock training structures; large agricultural levees restrict lateral floodplain connection. The lands comprising the Middle Mississippi River NWR were purchased in response to the 1993 flood after the failure of various private levees. Each existing division is named an "Island" although the term is now misleading. At one time these areas were actual islands, but River structures intended to keep water flowing to the center of the navigation channel have caused sedimentation through the decades, accreting the islands to the mainland and eliminating flowing side channels. To date, the Service has



USFWS Photograph

purchased a total of 4,075 acres (1,224 acres on Harlow Island, 2,770 acres on Wilkinson Island and less than 100 acres on Meissner Island). The Refuge Manager for Middle Mississippi River NWR is currently headquartered in Marion, Illinois.

Meissner

The 78-acre Meissner Island Division is located in Monroe County in Illinois between RM 153.5 and 155.5. The unit does not border the River. Due to its small size and limited access, little active management can be done on Division lands. The former cropland acreage is naturally regenerating with silver maple, cottonwood, and willow. Noxious weed control is an ongoing problem and is being treated on a spot-by-spot basis. Because of a lack of access, no public use is currently permitted on this parcel.

Harlow

Harlow Island Division is located in Jefferson County, Missouri, between RM 140.5-144. Following Service acquisition, levee breaks were not repaired, which allows the Mississippi River into the floodplain during high water events. The cropland has been allowed to naturally revegetate and many areas are now comprised of silver maple, cottonwood, and willow saplings. The remaining acreage is primarily bottomland forest with a small remnant side channel. Future plans call for planting oaks and other hard mast trees on higher elevations to increase forest diversity and investigating the feasibility of reconnecting the remnant side channel to the River. The Refuge also would like to improve public access at County Road AA and at the south end of the Division near the Truman Park boat ramp. Much of this latter work will be accomplished in 2003 under a federal grant through the Federal Highway Administration in cooperation with the Missouri Department of Conservation, which manages the Truman Park access.

Mark Twain NWR Complex Photograph



Wilkinson

The southernmost division of Mark Twain NWR Complex is Wilkinson Island, located between RM 88.5-93 in Jackson County, Illinois. Wilkinson Island Division is open to the River. The Refuge and the Mississippi River border one private inholding. The landowner has an access easement across the Refuge to his land. Natural revegetation has resulted in a thick stand of silver maple, cottonwood, and willow saplings. A few residual side channels and wetlands remain throughout the area, but restoration opportunities are limited due to the need to avoid affecting private land. Future management strategies include planting hard mast trees on higher elevations and investigating the feasibility of reconnecting the remnant side channel to the River.

Plan Implementation

The draft comprehensive conservation plan outlines an ambitious course of action for the future management of the Mark Twain National Wildlife Refuge Complex. Achieving the goals set out in this plan will require considerable staff commitment as well as funding commitment to acquire more wildlife habitats, to maintain existing public use facilities and develop outstanding new facilities.

There are currently 21 staff positions within the Refuge Complex. To fully implement all strategies in the comprehensive conservation plan, including land protection components, 18 positions would be added to the staff of the overall Complex during the next 15 years. These positions are primarily biologists, maintenance workers, and public use rangers.

Partnership Opportunities

Partnerships have become an essential element for the successful accomplishment of goals, objectives and strategies for all of the refuges within the Complex. The objectives outlined in this plan need the support and the partnerships of federal, state and local agencies, non-governmental organizations and individual citizens. This broad-based approach to managing fish and wildlife resources extends beyond social and political boundaries and requires a foundation of support from many organizations and people. We will continue to seek creative partnership opportunities to achieve our vision for the future.

Monitoring and Evaluation

Throughout the life of this plan we will monitor our progress on achieving the goals, objectives and strategies it establishes. On a periodic basis, the Service will evaluate Refuge Complex activities in light of the plan.

Plan Review and Revision

This plan is intended to provide guidance to Refuge managers and staff for the next 15 years. It is also intended to be a dynamic and flexible document. However, many of the strategies are susceptible to funding availability, while others may require adaptation due to such things as drought, extreme floods, wind-storms and other acts of nature. Because of these factors, the recommendations included in the comprehensive conservation plan will be reviewed periodically and, if necessary, revised to meet new circumstances.

Where You Can Find the Draft CCP

You can see the complete draft comprehensive conservation plan in a number of places. If you have access to the Internet, you can find a link to the plan at the following address: <http://midwest.fws.gov/planning/marktwaintop.htm>

More information on the Refuge Complex is available on the Refuge's web site: <http://midwest.fws.gov/marktwain/index.htm>.

Paper copies of the draft comprehensive conservation plan are also available in a limited supply. Please call the Refuge Complex at 217/224-8580 to request a copy. Copies of the plan are also available at local libraries in the area of each Refuge.

Tell Us What You Think

Public participation is the cornerstone of comprehensive conservation planning. By letting us know what you think of the draft plan, you can help the Refuge

Complex develop a plan that accomplishes conservation goals and fulfills the needs of people visiting the Mark Twain National Wildlife Refuge Complex.

We want to know if you feel we have addressed the key issues facing the Refuge Complex and whether we have missed any issues. For example, are there opportunities for land protection or habitat management or public use that we have failed to recognize? In reviewing the management alternatives, do you agree with our selection of a preferred alternative?

A public review period follows the release of the draft comprehensive conservation plan and this summary. You are invited to submit comments electronically through our web site (<http://midwest.fws.gov/planning/marktwaintop.htm>) or to mail comments to the Service.

If you would like to talk to Refuge staff about the future of the Mark Twain NWR Complex, please consider attending one of six open house style meetings scheduled between August 20 and September 8, 2003. Meetings are planned as follows:

August 20: 5 p.m. to 8 p.m. at the Great River/Clarence Cannon NWR Headquarters in Annada, Missouri.

August 21: 5 p.m. to 8 p.m. at the Holiday Inn in Quincy, Illinois.

August 26: 5 p.m. to 8 p.m. at the Briggs Center in Wapello, Iowa.

August 27: 6 p.m. to 9 p.m. at the Keithsburg City Hall in Keithsburg, Illinois.

September 4: 5 p.m. to 8 p.m. at the Randolph County Courthouse in Chester, Illinois.

September 8: 5 p.m. to 8 p.m. at the Two Rivers NWR Headquarters in Brussels, Illinois.

Comments are welcome at any stage throughout this planning effort, but in order for us to consider your comment as we prepare the final comprehensive conservation plan, we need to receive your comment by September 30, 2003.

Correspondence should be mailed to:

U.S. Fish & Wildlife Service
Branch of Conservation Planning
Attention: Mark Twain CCP Comment
BHW Federal Building
1 Federal Drive
Ft. Snelling, MN 55111



NEWS *from the National Wildlife Refuge System*

Mark Twain

National Wildlife Refuge Complex

Summary

Draft Comprehensive Conservation Plan

August 2003

Contents

Introduction to Mark Twain NWR Complex /	1
Who We Are and What We Do /	2
Comprehensive Conservation Planning /	3
Refuge Complex Vision Statement /	3
The Planning Process /	4
Resource Management Today /	5
Land Preservation Component /	10
Management Alternatives /	13
Future Management Direction /	17
Plan Implementation /	25
Where You Can Find the Draft CCP /	26
Tell Us What You Think /	26

Mark Twain National Wildlife Refuge Complex
1704 North 24th Street
Quincy, IL 62301